TYAPKIN, A.A., BAYUKOV, Yu.D, KOZODAYEV, M.S

"Investigation of Energy and Angular Distributions of π Mesons Produced by Protons with Energies of 470 and 660 MeV," paper presented at CERN Symposium, 1956, appearing in Nuclear Instruments, No. 1, pp. 21-30, 1957

TYAPKIN, A A.

89-10-3/36

AUTHORS   Vishnyakov V.V., Tyapkin A.A.,
TITLE   The Operation of Gas Discharge Counters Under Controlled Pulsed
            Voltage Conditions.
            (Issledovaniye raboty gazorazryadnykh schetchikov v rezhime upravly-
            ayemogo impul'snogo pitaniya - Russian)
PERIODICAL Atomnaya Energiya, 1957, Vol 3, Nr 1o, pp 298 - 3o7 (U.S.S.R.)

ABSTRACT   The counting errors caused by the dead time of the counter can be
            eliminated in the case of pulse-like feeding of gas discharge
            counters.
            The counting characteristics,effectivity and dissolving capacity
            of argon-metylal counting tubes MC-6, MC-7, MC-9 and the halide
            counting tube CTC were determined for the case that they are fed
            pulse-like. It was found that with short time feeding(duration of
            pulse $\sim 1o^{-6}$ sec) the counting tubes are still able to work at over-
            voltages of up to 2 KV. If this fact is taken advantage of for a
            hodoscope (telescope), the pulses coming from the counting tube
            need not be amplified and no coincidence with control pulses is
            necessary. Each channel of the hodoscope, with the exception of the
            counting tube, switches on only the load resistance and a neon sig-
            nal lamp. Thus a considerable simplification of the construction
            as well as reliability of operation is warranted.
            There are 11 figures.
AVAILABLE   Library of Congress.
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TYAPKIN, A.A

AUTHOR   PROKOSKIN, JU.D., TJAPKIN, A.A.   PA - 2086
TITLE   Investigation of the Excitation Functions for the Reactions $C^{12}(p,pn)C^{11}$,
         $Al^{27}(p,3pn)Na^{24}$, and $Al^{27}(p,3p\,3n)Na^{22}$ in the 150 - 660 MeV Energy Range
         (Issledovanie funkcij vozbuždenija dlja reakcij $C^{12}(p,pn)C^{11}$, $Al^{27}(p,3pn)$-
         Na^{24} i $Al^{27}(p,3p\,3n)Na^{22}$ v intervale energij 150 - 660 MeV).

PERIODICAL   Zhurnal Eksperimental'noi i Teoret. Fiziki, 1957, Vol 32, Nr 1, pp 177 -
             178 (U.S.S.R.)
             Received 3/1957   Reviewed 4/1957

ABSTRACT   The excitation function for the reaction $C^{12}(p,pn)C^{11}$ (1) was measured by
           R.AAMONT et al., Phys.Rev.88, 799 (1952), in the energy range from the
           threshold value to 340 MeV. Comparison of these results with those of L.
           M.S.SOROKO and B.V.GAVRILOVSKIJ (report of the Institute for Nuclear
           Problems 1952) indicated a rapid decrease of the cross sections in the 300
           to 460 MeV energy range. But according to the measurements of the ratio of
           cross sections in the case of 290 - 660 MeV energies the cross section of
           the reaction (1) diminishes much more slowly in this energy interval:
           $\sigma(670)/\sigma(290)$ = 0,84 ± 0,03. The authors concluded from this that the real
           reason for this non-agreement is obviously a systematic error ($\sim 15\%$)
           committed on the occasion of the determination of the absolute cross section
           in the above mentioned previous works. Results of more recent works show
           better agreement. The cross sections found in the aforementioned previous
           works are obviously too high by 15 to 25%. Because of these unclear-
           nesses the authors investigated reaction (1) in the 150 - 660 MeV energy
           interval. For this purpose a graphite target was installed in the chamber

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Investigation of the Excitation Functions for the Reactions $C^{12}(p,pn)C^{11}$, $Al^{27}(p,3pn)Na^{24}$, and $Al^{27}(p,3p\ 3n)Na^{22}$ in the 150-660 MeV Energy Range.

of the accelerator of the laboratory for nuclear problems. The proton flux passing through the target was determined by means of a gauge-thermo-battery. By means of a group of proportionality counters the relative activity of graphite targets was measured and a value of $20,8 \pm 0,2$ minutes was obtained for their half life. The following energy dependence of the cross section of reaction (1) was found (E_p - energy of the protons in the MeV, $\sigma' = \sigma(E_p)/\sigma(660)$ - relative cross section of the reaction).

E_p	150	260	290	350	450	560	660
$\sigma'(C^{11})$	1,49 + 0,06	1,23	1,19	1,16	1,03	0,98	1,00

In the case of E_p 260 to 660 MeV errors of $'$ are omitted for space saving purposes. These data are also illustrated in a diagram. The data found by the authors agree with other more recent data.

By means of the above method also excitation functions for the reactions $Al^{27}(p,3pn)Na^{24}$ (2) and $Al^{27}(p,3p\ 3n)Na^{22}$ (3) are determined. They are given in a table. The ratio between the cross sections of reactions (1) and (2) decreases monotonously with increasing energy. This is contra-dictory to the result found by G.CHACKETT, K.CHACKETT et al. according to which this ratio of cross sections decreases rapidly in the 200-500 MeV energy range. This is indicative (in contrast to the data of the present work) of the existence of a maximum of the cross section of reaction (2).

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PA - 2086

Investigation of the Excitation Functions for the Reactions $C^{12}(p,pn)C^{11}$, $Al^{27}(p,3pn)Na^{24}$, and $Al^{27}(p,3p\ 3n)Na^{22}$ in the 150-660 MeV Energy Range.

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TYAPKIN, A.A.

AUTHOR   BAJUKOV, J.D., OGANESJAN, J.C., TJAPKIN, A.A.   PA - 2038
TITLE   The Absorption of γ-Quanta with the Average Energy of 500 MeV in Lead, Copper, and Aluminium. (Russian)

ABSTRACT   γ-quanta originate from the decay of neutral pions which were produced in the inner target of a phasotron by 660 MeV protons. These γ-quanta were recorded by a pair-like γ-spectrometer with 12 channels, on which occasion the spectrometer was at a distance of 23 m from the target. Before the collimator, which was fitted behind a protective wall of 4 m thickness, a device was arranged, by which the bundle of γ-quanta was periodically interrupted by means of a lead absorber. The γ-quanta recorded by the spectrometer in the case of fully covered and not fully opened bundles were counted separately.
For the determination of the coefficients of the absorption of the γ-quanta in Cu and Al the semicircular lead disk in the rotating device was replaced by absorbers of copper and aluminium. The frequent change of absorbers made it possible to carry out measurements without a monitor and to diminish the number of measuring errors. The bundle of γ-quanta passing through the collimator was purified from electrons and positrons by means of a special magnet. The authors obtained the following values (in cm^2/g) for the coefficients of the absorption of γ-quanta with the energy of $E_\gamma = 500 \pm 50$ MeV:

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The Absorption of γ-Quanta with the Average Energy of 500 MeV in Lead, Copper, and Aluminium.

Pb 0,1115 ± 0,0025, Cu 0,0510 ± 0,0025, Al 0,0295 ± 0,0017.
The absorption of the γ-quanta at E_γ = 500 MeV takes place essentially by the production of electron-positron pairs. As shown by computation results, absorption by photo effect and Compton effect amounts to $\sim$ 1,2 % in the case of Cu, and to $\sim$ 2 % of the total absorption cross section in the case of Al. The cross sections for the absorption of γ-quanta found here agree well with the computed results obtained by H. DAVIES, H.BETHE, L.MAXIMON, Phys.Rev., 93, 788 (1954).
It remains to be added that the data for 500 MeV γ-quanta which agree with computations were obtained in the case of permanent presence of a lead absorber of 5,55 g/cm^a thickness in the bundle. If such a lead absorber, by which the bundle is filtered, is lacking, cross sections which are larger by 10 % are obtained. When measuring the absorption cross section of 280 MeV γ-quanta, no influence was found to be exercised by the additional absorber by which the bundle is permanently covered. The cross section of the absorption of 280 MeV γ-quanta obtained here agrees with the results obtained by J.W.DE-WIRE, A.ASKIN, L.A.BACH, Phys.Rev., 83, 505 (1951). The reason for the increase of the absorption cross section of 500 MeV γ-quanta when an additional lead filter was lacking could not be explained.

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PA - 2038

The Absorption of γ-Quanta with the Average Energy of 500 MeV
in Lead, Copper, and Aluminium.

ASSOCIATION United Institute for Nuclear Research, Laboratory for Nuclear Problems.
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Experimental Comparison of the Energy Spectra of γ-Quanta   PA - 2699
resulting from the Decay of Neutral Pions (which were created by
660 MeV-Protons on Carbon- and Lead-Nuclei).

This modification is due to the interaction of the bombarding
protons with the nucleons of the nucleus on the occasion of
strong absorption of mesons. The hard γ- quanta with the angle
of observation 0° are essentially created on the occasion of the
decay of those neutral pions which are created on that side of the
nucleus which is averted from the bombarding protons and is
heavely screened off by the remaining nucleons of the nucleus.
The soft γ-quanta, however, are essentially created on the
surface of the nucleus which is exposed to the protons. There-
fore, a relative increase of soft γ-quanta in the spectrum
is observed on the occasion of the creation of neutral pions
on heavy nuclei.
Considerable differences are to be expected also in the energy
distributions of the mesons created on light and heavy nuclei.
The energy distributions of the neutral pions created under an
angle of 0° on carbon- and lead-nuclei do not differ noticeably.
Possibilities for a more close study of these pion spectra are
shown. (1 table)

ASSOCIATION: United Institute for Nuclear Research
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SUBMITTED: 2. 11. 1956.
AVAILABLE: Library of Congress.
CARD 2/2

AUTHOR   BAYUKOV, Yu.D., KOZODAYEV, M.S., TYAPKIN, A.A.   56-4-5/52

TITLE   The Investigation of the Energetic and Angular Distribution of π-Mesons
             Formed On Carbon Nuclei by Protons With An Energy of 470 and 660 MeV.
             (Issledovaniye energeticheskikh i uglovykn raspredeleniy π-mezonov,obrazo-
             vannykh na yadrakh ugleroda protonami s energiyey 470 i 660 MeV -Russian)

PERIODICAL   Zhurnal Eksperim.i Teoret.Fiziki,1957,Vol 32,Nr 4,pp 667-677(U.S.S.R.)
             Received 7/1957   Reviewed 8/1957

ABSTRACT   The results obtained by the investigation of energetic spectra on the oc-
             casion of the decay of π°-mesons produced on carbon nuclei by protons
             with the energy of 660 MeV is discussed.The method of spectral analysis
             was used.The neutral mesons have a very short life(5,10^{-15} sec.).
             The experimental scheme is shown in form of an illustration.The carbon tar-
             get is inside the vacuum chamber of the accelerator and was irradiated with
             protons of the average enrgy of 660 MeV. The γ-quanta formed in the target
             penetrated through an opening into a concrete wall of 4 m thickness and
             collimated through a diaphragm into a lead block.The collimated bundle of
             γ-quanta,which was purified from charged particles by the magnetic field
             of a special electromagnet,penetrated into the converter of the 12-channel-
             led pair-spectrometer.The spectrometer was set up at a distance of 23 m
             from the target in the direction of the tangent to the orbit of the protons.
             The author haere gives a detailed description of the pair spectrometer used.
             The differential cross section for the production of γ-quanta on the carbon
             nuclei by protons with an energy of 660 MeV for 18L° in the laboratory sy-

Card 1/3   stem amounts to $d\delta^{\gamma}_{c}/d\omega(180°)=(1.5\pm0,2).10^{-27}$ cm²/sterad. The ratio of

The Investigation of the Energetic and Angular Distribution 56-4-5/52
of π^0-Mesons Formed On Carbon Nuclei by Protons With An Energy of 470
and 660 MeV.

the flux of γ-quanta under the angles 0 and 180° is equal to 5,1+0,3.
The energy spectra of the γ-quanta is then analyzed.
1. Dependence of the spectrum on the angular- and energetic distribution of
the π^0-mesons. It follows that with the isotropic distribution of the π^0-me-
sons, independent of their energy distribution, the spectrum of the γ-quan-
ta is of symmetric shape with respect to the energy $1/2 \varepsilon_0$.
2. Comparison of the energy spectra of γ-quanta on the occasion of the de-
cay of π^0-mesons produced by protons with the energy of 470 MeV on the nuc-
lei of beryllium. Illustration 5 shows that the energy spectrum of the γ-
quanta of the decay of mesons produced by photons with the energy of 470
MeV(center of mass system) on the nuclei of carbon. At a proton energy of
470 MeV energies are produced, which are an approximation to the maximum
possible energy attainable by the meson in the reaction. With an energy of
660 MeV of the protons, mesons with considerably lower energies are formed
than is possible as a maximum.
3. Energy spectra of π^0-mesons produced by protons with the energy of 770
and 660 MeV. Illustration 7 shows the energy distribution of π^0-mesons in
the center of mass system for carbons by protons with the energy of 470
MeV. On the same illustration it shows the spectrum of π^0-mesons. The energy-
and angular distribution of π^0- mesons which had been measured at a proton
energy of 470 MeV shows that the mesons produced in this case which are
neutral on the occasion of the collision of nucleons, absorb the greatest
part of the free energy of the collision, as well as also the greatest an-

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The Investigation of the Energetic and Angular Distribution 56-4-5/52 of π^0-Mesons Formed On Carbon Nuclei by Protons With An Energy of 470 and 660 MeV.

gular momentum. The same phenomenon is observed in the case of lower pro-ton energies. At proton energies of 470 MeV the spectra of π^0-mesons pro-duced on composed nuclei differ only slightly from spectra computed on the assumption that mesons are produced only with maximum energies, so that at a proton energy of 660 MeV a considerable difference between the spectra obtained and those computed at the same conditions is observed. At a proton energy of 660 MeV π^0-mesons with an energy that is considerab-ly lower than that which is possible as a maximum are mostly produced. Con-sequently it follows that in the case of the production of mesons by the proton energy of 660 MeV the nucleons in the final state acquire a high kinetic energy and, therefore, also high momenta. With an increase of proton energy from 470 to 660 MeV the angular distribution of the π^0-mesons chan-ges considerably.

ASSOCIATION   United Institute for Nuclear Research
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TYAPKIN, A. A.

56-4-17/52

AUTHOR
TITLE

PROKOSHKIN, Yu. D., TYAPKIN, A.A.
Production of Neutral Pions at the p-p and p-n Collisions in the Region of the Energies From 390 to 660 MeV
(Obrazovaniye π^0-mezonov v p-p i p-n soudareniyakh v oblasti energiy 360 ÷ 660 MeV. Russian)

PERIODICAL

Zhurnal Eksperim. i Teoret. Fiziki, 1957, Vol 32, Nr 4, pp 750 - 766
(U.S.S.R.)

ABSTRACT

For the above-mentioned region of the proton energies and for different angles the authors of the paper under review determined the outputs of the γ-quanta caused by the decay of neutral pions. These pions were produced at the reactions $p+p \rightarrow \pi^0 + p+p$ (I) and $p+n \rightarrow \pi^0 + \begin{cases} d & (a) \\ p+n & (b) \end{cases}$ (II)

With the aid of these measurements it was possible to determine for the above reactions the absolute values of the total cross sections, the excitation functions, and the angular distributions of the neutral pions

The methods employed in the measurements are described with the aid of a sketchy draft depicting the measurement arrangement. The neutral pions were produced in a target which was bombed by the protons of the inner bundle (maximum energy ~ 680 MeV) of a phasotron. The γ-quanta produced in the decay of the neutral pions penetrated a steel collimator in a concrete wall of a thickness of 4 m, and a lead diaphragm. In a distance of 3 m from the diaphragm, a telescope recorded the γ-quanta. The paper under review contains a detailed discussion of the way in which the

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Production of Neutral Pions at the p-p and p-n Collisions in the Region
of the Energies From 390 to 660 MeV

measurements were conducted.

The results of the measurements and their discussion. - The differential
cross section, as obtained under the 'isotropic' angle ϑ * , of the
production of γ-quanta is connected with the total cross section of the
production of neutral pions by the relationship $\sigma_{\pi^0} = 2 \, d(\vartheta *)/d\Omega$.

The absolute differential cross section of the production of γ-quanta
on carbon at the energy of 660 MeV amounts to $d\sigma_C^\gamma /d = (8.1 \pm 0.4)$.
$.10^{-27}$ cm^2/sterad. For the total cross section of the reaction, the
authors of the paper under review obtained the value
$\sigma_{pp}^{\pi^0}$ (660) = $(3.6 \pm 0.2) . 10^{-27}$ cm^2. If the bend of the nucleons in
the nucleus is neglected, then $\sigma_{pn}^{\pi^0}$ (660) = $(7.0 \pm 1.1). 10^{-27}$ cm^2 is

obtained. The energy dependence of these total cross sections is shown
in a diagram contained in the paper under review. For the angular di-
stribution of the neutral pions at the reactions (I) and (II), respec-
tively, f_{pp} (660)$\sim$ (1/3)+ (0.01 $\pm$ 0.06) cos$^2\vartheta$, f_{pn}(660)$\sim$(1/3)+(0.0 $\pm$
$\pm$ 0.6) cos$^2\vartheta$ were obtained. Finally the paper under review discusses

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Production of Neutral Pions at the p-p and p-n Collisions in the Region of the Energies From 390 to 660 MeV

these results. All experimental data support the assumption of the predominant influence of the resonance transitions ($T = 3/2$, $J = 3/2$) at energies of ~ 600 MeV. (11 reproductions, 4 charts).

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24 December 1956
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TYAPKIN, A. A.

56-5-1/55

AUTHOR
TITLE

BAYUKOV, Yu.D., TYAPKIN, A.A.,
The Energy Spectrum of γ-quanta of the Decaying π⁰-Meson Created by the Interaction of 660 MeV protons with Hydrogen Nuclei
(Energeticheskiy spektr γ-kvantov ot raspada π⁰-mezonov, obrazovannykh protonami s energiyey 660 MeV na yadrakh vodoroda, Russian).

PERIODICAL
Zhurn. Eksperim. i Teoret. Fiziki, 1957, Vol 32, Nr 5, pp 953 - 956
(U.S.S.R.)

ABSTRACT

The γ-quanta were measured with the help of a scintillation telescope, on which occasion the production of π⁰-mesons took place in such a manner that two targets one of polyten and one of carbon, were one after the other exposed to the inner of the phasotron. Besides, a number of double targets was alterningly irradiated in such a manner that, simultaneously with the change of target, also the γ-counting device could be adjusted to this pair of targets.

The angular distribution of the π⁰-mesons created by the collision of 660 Mev protons with H-nuclei has the form

$$1 + (0,3 \pm 0,1) \cos^2 \theta$$

The π⁰-mesons spectrum has a marked maximum at $\approx$ 75 MeV.

Furthermore it was established experimentally that the angular distribution of the π⁰-mesons created by p-p interaction is isotropic.

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The Energy Spectrum of γ-quanta of the Decaying π^0-Meson Created by the Interaction of 660 MeV protons with Hydrogen Nuclei

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United Institute for Nuclear Research

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Tyapkin, A.A.

56-2-1/47

AUTHOR   PROKOSHKIN, Yu. D., TYAPKIN, A.A.,
TITLE   Production of Neutral π-Mesons on Various Nuclei by 260 - 660 MeV
                Protons
                (Obrazovaniye neytralnykh, π-mesonov na yadrakh razlichnykh elementov
                protonami v intervale energii 260 - 660 MeV. Russian)

PERIODICAL   Zhurnal Eksperim. i Teoret. Fiziki 1957, Vol 33, Nr 2 (8), pp 313 -
                - 319 (U.S.S.R.)

ABSTRACT   If complex nuclei are bombarded with protons (260 - 660 MeV of the
                6 m phasotron), it is possible to prove the forming of π-mesons by
                the quanta γ accompanying their decay.

                The angular distribution of these γ-quanta, which in practice corre-
                sponds to the angular distribution of the π-mesons, was measured
                for the following nuclei and elements (proton energy 660 MeV):

element	0°	35°	55°	160°	169°	180°	angle in C.m. S.
Li^6	×		×	×		×	
Li^7	×		×	×	×	×	
Be	×		×	×		×	
C	×	×	×	×	×	×	

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Production of Neutral π-Mesons on Various Nuclei by 260 - 660 MeV
Protons

element	0°	35°	55°	160°	169°	180°	angle in c.m.
Al	×		×	×		×	
Cu	×		×	×		×	
Cd, Sn	×		×			×	
Pb	×		×	×		×	

Furthermore, the dependence of the differential cross section on
atomic weight was determined for the following different proton ener-
gies: 260, 340, 445 and 660, and the angles 33°, 147°, 40°, 140° in
the elements D, Li⁶, Li⁷, Be, C, Al, Cu, Sn, Pb, U.
(With 4 tables, 2 illustrations, and 6 Slavic references).
United Institute for Nuclear Physics
(Obyedinennyy institut yadernykh issledovaniy)

27.2.1957
Library of Congress

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TYAPKIN, A. A.: Master Phys-Math Sci (diss) -- "The formation of neutral pi
mesons by protons in the energy range between 400 and 660 MEV". Dubna, 1958,
10 pp (Joint Inst of Nuclear Investigations, Laboratory of Nuclear Problems)
153 copies (KL, No 5, 1959, 143)

BAYUKOV, Yu.D.; KOZODAYEV, M.S.; MARKOV, A.A.; SINAYEV, A.N.; TYAPKIN, A.A.

Multichannel pair gamma-spectrometers. Part 1: Calculation
of basic characteristics of gamma-spectrometers. Prib. i tekh. eksp.
no.6:23-29 N-D '58.   (MIRA 12:1)

1.Ob"yedinennyy institut yadernykh issledovaniy.
                 (Spectrometer)

TYAPKIN, A.A.

BAYUKOV, Yu.D.; KOZODAYEV, M.S.; MARKOV, A.A.; SINAYEV, A.N.; TYAPKIN, A.A.

Multichannel pair gamma-spectrometers. Part. 2: Description of
a twelve-channel spectrometer. Prib. i tekh. eksp. no.6:30-40
N-D '58.

(MIRA 12:1)

1.Ob"yedinennyy institut yadernykh issledovaniy.
(Spectrometer)

AUTHORS: Zrelov, V. P., Tyapkin, A. A., Farago, P. S.   SOV/56-34-3-4/55

TITLE: Measurement of the Proton Mass at 660 MeV   (Izmereniye massy protonov pri energii 660 MeV)

PERIODICAL: Zhurnal Eksperimental'noy i Teoreticheskoy Fiziki, 1958, Vol. 34, Nr 3, pp. 555-558 (USSR)

ABSTRACT: The present work compares the values computed by means of the relativistic relation $m_2 = m_0 \left[1 - (v^2/c^2)\right]^{-1/2}$ based on the velocity measured with the values $m_1 = p/v$ of the mass which were determined from the measured momenta and velocities of protons. The measurements were made on an external proton beam with about 660 MeV which made essentially easier the determination of possible errors. The general scheme of the measuring device is shown in a diagram. The external beam of a 6 m-synchrocylotron passes a system of collimators, then was deflected within the field of an electromagnet with a pole diameter of 1 m, passed a second collimator and then impinged upon ionization chamber. The control measurements are also described. In the determination of the momentum of protons by means of a current carrying conductor the values

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Measurement of the Mass of 66o MeV Protons   SOV/56-34-3-4/55 . . .

$Q = 300.0 \pm 0.3$ and $I = 0.681 \pm 0.001$ amp. were obtained. Q de-
noting the load applied to a silk thread. From this the value
$p = 1296,5 \pm 2.3$ MeV/c is obtained for the momentum. Various
measurements carried out at $Q = 200,o$ g showed results which
coincide within the limit of measuring errors with earlier
obtained results. Various details of the measurements are dis-
cussed. Also the second correction of the energy loss in air
must be taken into account which amounts to $\Delta E_2 = 1,5$ MeV. The
total correction of the energy amounts to $\Delta E = \Delta E_1 + \Delta E_2 =$
$= 8.1$ MeV. The authors intend to determine the deviations
from the fundamental law of relativistic theory $m = m_0 [1-$
$-(v^2/c^2)]^{1/2}$, and use relativistic relations in the determi-
nation of the corrections ΔE and Δv. When the found values
for the momentum and velocity of the protons are taken into
account $m_1 = p/v = 1598.2 \pm 3$ MeV $/c^2$ and $m_2 = m_0 [1-(v^2/c^2)]^{-1/2}$
$= 1604.3 \pm 1.3$ MeV/c^2 are obtained. From this further results
$\Delta m = m_2-m_1 = 6.1(1 \pm 0.5)$ or $\Delta m/m = 0,004(1 \pm 0.5)$. The er-
rors mentioned are the mean square deviations. Thus the re-
sults obtained here coincide with the relativistic law for the
increase of mass with increasing velocity within the error
Card 2/3   limits mentioned.

Measurement of the Proton Mass at 660 MeV   SOV/56-34-3-4/55

There are 1 figure and 9 references, 2 of which are Soviet.

ASSOCIATION: Ob"yedinennyy institut yadernykh issledovaniy
(United Institute for Nuclear Research)

SUBMITTED: September 12, 1957

Card 3/3

TYAPKIN, Aleksey A.

"Determination of f^2 from n-p Scattering"

"Phase Analysis of Nucleon-Nucleon Scattering"

paper presented at the Intl Conference on High Energy Physics, Rochester, N. Y. and/or Berkly California, 25 Aug - 16 Sep 1960.

Joint Institute for Nuclear Reserch, Dubna, USSR

TYAPKIN, Aleksey A.

"Discharge Origin on Flat Controlled Counter Along Particle Track"

paper presented at the Intl Conference on High Energy Physics, Rochester, N. Y. and/or Berkly California, 25 Aug - 16 Sep 1960.

Joint Institute for Nuclear Reserch, Dubna, USSR

TYAPKIN, Aleksey A.

"Discharge Origin on Flat Controlled Counter Along Particle Track"

paper presented at the Intl Conference on High Energy Physics, Rochester, N.Y.
and/or Berkly California, 25 Aug - 16 Sep 1960.

Joint Inst. for Nuclear Reserch, DUBNA, USSR

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B006/B070

24.6900 (1138,1191,1559)

AUTHORS: Neganov, B. S., Parfenov, L. B., Tyapkin, A. A.

TITLE: Measurement of the Relative Nuclear Activity of Pions in
            the Vicinity of the Point of Production

PERIODICAL: Zhurnal eksperimental'noy i teoreticheskoy fiziki, 1960,
            Vol. 38, No. 6, pp. 1917 - 1918

TEXT: Irish research workers (Ref. 1) discovered an anomalously large scat-
tering cross section on pions produced in $K_{\pi 2}$ decays. The value was two or
three times that of the geometrical cross section. It was assumed by them
that either the pions produced by K-decay were different from the ordinary
ones, or the nuclear activity was anomalously large in the region of pion
production. These assumptions are discussed in the introduction of the
present paper, followed by a brief report of the experimental measurements.
The nuclear activities of mesons were compared at distances of 2-4, 10-20,
21-23, and 105-115 cm from the point of production, the mesons being emit-
ted at 90° by 660-Mev protons incident on carbon nuclei. The measurements

Card 1/2

Measurement of the Relative Nuclear Activity
of Pions in the Vicinity of the Point of
Production

85705

S/056/60/038/006/048/049/XX
B006/B070

were made by means of two telescopes each consisting of three scintillation counters. The relative change in the counting rate in the two telescopes caused by brass filters of a thickness of 17 g/cm^2 was measured. The filters were placed either in front of the first counters or behind the second in the telescope. In this manner, the nuclear absorption of mesons whose energy changed from 100 to 70 Mev in passing through the filter was determined; (this energy interval corresponds to the meson energies from $K_{\pi 2}$ decay). Only an insignificant lowering of the nuclear activity could be observed in the experiments, and was probably due to errors in measurement. There is 1 non-Soviet reference.

ASSOCIATION: Ob"yedinennyy institut yadernykh issledovaniy (Joint
Institute of Nuclear Research)

SUBMITTED: April 19, 1960

Card 2/2

84971

24.6900

AUTHORS: Vasilevskiy, I. M., Vishnyakov, V. V., Iliyesku, E.,
Tyapkin, A. A.

TITLE: The Spin Correlation Coefficient in pp-Scattering at an
Energy of 310 Mev Through an Angle of 90° in the
Center-of-mass System

PERIODICAL: Zhurnal eksperimental'noy i teoreticheskoy fiziki, 1960,
Vol. 39, No. 3(9), pp. 889 - 891

TEXT: In the introduction, the authors give a survey of the results of
phase shift analyses of elastic 310-Mev pp-scattering events published
in America. The spin correlation coefficients $C_{nn}(90°)$, which determine
the correlation between the spin components perpendicular to the plane
of scattering, are given for different phase shift sets (sets No. 1,2,3,
4,6: 0.158, 0.711, 0.300, 0.490, and 0.425). Other calculations
(Refs. 3-5) give other $C_{nn}(90°)$ values (No. 1: 0.38; No. 2: 0.61). Ex-
periments for the determination of $C_{nn}(90°)$ carried out at Liverpool

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84971

The Spin Correlation Coefficient in   S/056/60/039/003/057/058/XX
pp-Scattering at an Energy of 310 Mev   B006/B070
Through an Angle of 90° in the Center-of-mass System

(E_p = 320 Mev) and Dubna (315 Mev) point rather to set No. 2; $C_{nn}(90°)$ = 0.75 ± 0.11 (Liverpool) and $C_{nn}(90°)$ = 0.7 ± 0.3 (Dubna). The authors have now completed their calibration tests with reference to the analyzability of the scatterer and determined C_{nn} anew. $C_{nn}(90°)$ was found to be equal to $0.84^{+0.10}_{-0.22}$. The authors then discuss estimates of the contributions of the singlet, triplet, and tensorial interactions b^2, c^2, and h^2, respectively. According to S. B. Nurushev, for example, $b^2 \approx 25\%$, $c^2 \sim 62\%$, and $h^2 \approx 13\%$. The effect of taking into account a smaller number of phase shifts in the analysis on the agreement between theory and experiment is also discussed. It is noted that if 9 phase shifts instead of 14 are considered, and the pion-nucleon coupling constant g^2 is taken into account, a coefficient value of about 0.41 is obtained for the first and the second set. L. B. Okun' and I. Ya. Pomeranchuk are mentioned. There are 10 references: 3 Soviet, 6 US, and 1 British.

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The Spin Correlation Coefficient in   S/056/60/039/003/057/058/XX
pp-Scattering at an Energy of 310 Mev   B006/B070
Through an Angle of 90° in the Center-of-mass System

ASSOCIATION: Ob"yedinennyy institut yadernykh issledovaniy (Joint
               Institute of Nuclear Research)

SUBMITTED: June 27, 1960

Card 3/3

83986

S/053/60/072/001/004/005
B013/B060

26.2264

AUTHORS: Vishnyakov, V. V., Tan Syao-vey, Tyapkin, A. A.

TITLE: Low-voltage Halogen Counters *9*

PERIODICAL: Uspekhi fizicheskikh nauk, 1960, Vol. 72, No. 1,
             pp. 133 - 152

TEXT: The authors studied the discharge mechanism in low-voltage halo-
gen counters. They differ from ordinary self-quenched counters filled
with organic vapors by the processes taking place in them. The charac-
teristics of halogen counters under pulse feeding conditions were exam-
ined along with the part played by negative ions (Figs. 1 and 2). In
addition, the authors studied semi-self-maintained discharge and its
development in time (Fig. 3); the development of self-maintained dis-
charge and the retardation of pulses (Figs. 4-6); discharge fluctuations
near the threshold (Figs. 7 and 8). The particular character of the dis-
charge development in time, depending on ionization on the expense of
collisions of the second kind, explains a number of specific properties
of low-voltage halogen counters. The particular character of such a

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Low-voltage Halogen Counters

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B013/B060

discharge consists in that every ionization process is preceded by a
certain diffusion time of the metastable neon atom (its collision with
an impurity atom). The description of the discharge mechanism in halogen
counters also conveys an explanation of the changes occurring in the
properties of these counters on an increase of the halogen concentration.
An augmented halogen addition leads to an increase in the critical volt-
age (Ref. 14). It was found that the specific properties of low-voltage
halogen counters appear less and less marked with increasing halogen
amount. These properties are characteristic of a discharge occurring as
a result of the formation of metastable atoms of the initial gas and
the ionization of impurity atoms brought about by the collision of the
second kind. On a rise of the critical voltage in the counter an ioniza-
tion of the gas occurs directly due to the electron impact. The part
played by such an ionization becomes increasingly more important with
rising voltage. For this reason, the mathematical description given in
the present paper of the discharge in low-voltage halogen counters at a
halogen pressure of some torrs is not applicable. At a sufficiently high
halogen pressure, such a counter is transformed into a high-voltage

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Low-voltage Halogen Counters

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counter, in which the discharge does not differ from that in an ordinary self-quenched counter. I. I. Glotov, L. S. Eyg, are mentioned. There are 8 figures and 23 references: 9 Soviet.

Card 3/3

TYAPKIN, A.A.

Fifth International Conference on High Energy Physics. Atom. energ.
10 no.1:80-83 Ja '61.   (MIRA 13:12)
                    (Nuclear physics—Congresses)

TYAPKIN, A.A.

International Conference on Instrumentation in High Energy Physics.
Atom. energ. 10 no.1:83-85 Ja '61.   (MIRA 13:12)
          (Nuclear physics--Congresses)

S/120/62/000/005/013/036
E039/E420

AUTHORS: Tyapkin, A.A., Tsou Chu-Lien

TITLE: Obtaining a discharge in a spark chamber along
             particle tracks

PERIODICAL: Pribory i tekhnika i eksperimenta, no.5, 1962, 84-87

TEXT: Conditions are investigated for obtaining discharges
along tracks of ionizing particles which are inclined to the
electric field in a spark chamber with rectangular electrodes of
thin aluminium foil and without layers of dielectric between the
electrodes and the working space.   The aim of the investigation
is to find the information necessary for making large multilayer
discharge chambers for measuring the polarization of recoil
protons in the elastic scattering of π mesons on hydrogen.
The aluminium foil electrodes (220 x 120 mm) are curved at the
edges to eliminate breakdown and are mounted on aluminium tubes
in a plexiglass framework.   This is enclosed in an aluminium box
with two observation windows.   The pulsed power supply can
provide pulses of up to 18 KV with a rise time of 10^{-8} sec and a
duration of $0.3\,\mu$ sec.   A mixed filling of neon plus 0.5% argon
Gard 1/2

Obtaining a discharge ...

S/120/62/000/005/013/036
E039/E420

at 1.5 atm is used with an interelectrode distance of 17 mm. Discharges are observed for pulses of amplitude > 7.5 KV the intensity of which increases with voltage. Inclination of the particle tracks to the field direction showed that stable operation is obtained for angles up to 15° and that for angles between 15 and 30° unstable operation occurs. A photograph of a track inclined at 40° to the applied field is shown, this being obtained in a larger discharge chamber with electrodes of 25×50 cm^2 and an interelectrode distance of 23 mm. The variation in efficiency for different pulse delay times is also investigated. There are 4 figures.

ASSOCIATION: Ob"yedinennyy institut yadernykh issledovaniy
              (Joint Institute for Nuclear Research)

SUBMITTED: December 29, 1961

Card 2/2

TYAPKIN, A.A.; TSOU CHZHU-IYAN; NADEZHDINA, N.I. [translator]

The appearence of a discharge in a spark chamber aleng
a particle track. Dubna, Ob"yedinennyi in-t iadernykh
issledovanii, 1962. 11 p.

(No subject heading)

VASILEVSKIY, I.M.; VISHNYAKOV, V.V.; ILIYESKU, E.; TYAPKIN, A.A.

Measurement of the spin correlation coefficient in elastic
pp-scattering at 315 Mev. Zhur. eksp. i teor. fiz. 45 no.3:
474-479 S '63.   (MIRA 16:10)

1. Ob"yedinennyy institut yadernykh issledovaniy.
          (Protons—Scattering)

NIKITIN, V.; TYAPKIN, A.

International Conference on Elementary Particles. Atom.energ.
16 no. 4:374-376 Ap '64.
(MIRA 17:5)

TYAPKIN, A.A., doktor fiz.-matem. nauk

Development of the methodology of spark chambers. Vest. AN SSSR
34 no.12:15-21   D '64   (MIRA 18:1)

1. Ob"yedinennyy institut yadernykh issledovaniy.

TYAPKIN, A.A.

In search for the "crazy idea." Usp. fiz. nauk 86 no.4:747-751 Ag
'65.   (MIRA 18:8)

PHASE I BOOK EXPLOITATION   SOV/6476

Ivanov, Yu. A. and B. V. Tyapkin

Infrakrasnaya tekhnika v voyennom dele (Military Application of
    Infrared Technology) Moscow, "Sovetskoye Radio", 1963.
    358 p. 9800 copies printed.

Scientific Ed.: Lt. Col. I. F. Usol'tsev, Engineer; Ed.:
    A. I. Dikareva; Tech. Ed.: V. V. Belyayeva.

PURPOSE: This book is intended for military personnel but
    may also be useful to nonmilitary readers interested in
    infrared technology.

COVERAGE: The first part of the book deals with the physical
    and technical problems of infrared radiation, propagation,
    and recording, and with elements of military devices
    utilizing infrared rays. The second part contains an
    analysis of the development as of 1960 of infrared devices

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     2

Military Application (Cont.)   SOV/6476

used by non-Soviet armed forces. The application of
infrared devices in tactical and strategic reconnaissance,
aiming of missiles and shells at heat-radiating targets,
contactless blasting of ammunition in the vicinity of
the target, detecting and aiming at heat-radiating targets
at night, navigation, communication and signalling between
small units, protection of military objectives, and the
blocking of narrow sectors of terrain is given particular
attention. The authors thank L. Z. Kriksunov, Doctor of
Technical Sciences, and M. A. Bramson, Candidate of
Technical Sciences, for reviewing the book, and S. V.
Yudkevich, Engineer, for his advice. There are 203
references, 41 Soviet (including 4 translations), 153
English, 7 German and 1 French.

TABLE OF CONTENTS:

Card 2/9

IVANOV, Yu.A.; TYAPKIN, B.V.; KRIKSUNOV, L.Z., doktor tekhn. nauk,
    retsenzent; BRAMSON, L.Z., kand. tekhn. nauk, retsenzent;
    USCL'TSEV, I.F., inzh.-podpolkovnik, nauchnyy red.;
    DIKAREVA, A.I., red.; BELYAYEVA, V.V., tekhn. red.

[Military applications of infrared technology] Infrakrasnaia
tekhnika v voennom dele. Moskva, Sovetskoe radio, 1963.
                                        (MIRA 16:5)
358 p.
        .(Infrared rays—Military applications)

GOLIZDRA, G.Ya.; TYAPKIN, K.F.

A method for smoothing out gravity anomalies. Izv.AN SSSR.Ser.
geofiz. no.4:614-617 Ap '63.   (MIRA 16:4)

1. Dnepropetrovskiy gornyy institut im. Artema.
                        (Gravity anomalies)

TYAPKIN, K.F.

Taking into account lateral influences in interpreting plane gravity
anomalies by a direct method. Dop. AN URSR no.11:1462-1466 '61.
(MIRA 16:7)

1. Dnepropetrovskiy gornyy institut. Predstavleno akademikom
AN UkrSSR S.I.Subbotinym.
(Gravity prospecting)

TYAPINA, L. A.

Effect of ascorbic acid on cholesterinemia in hypertension
in atherosclerosis. Tr. Akad. med. nauk SSSR. Vol.20:108-113
1952.
(CIML 25:5)

1. Of the Institute of Therapy (Director -- A. L. Myasnikov,
Active Member AMS USSR), Academy of Medical Sciences USSR.

TYAPINA, Lidiya Antonovna; SHIBAYEV,N.A., redaktor;GLUKHOYEDOVA,G.A.,
tekhnicheskiy redaktor

[Dieting for the overweight] Kak pitat'sia pri ozhirenii. Mo-
skva, Gos.izd-vo meditsinskoi lit-ry, 1955. 34 p. (MLRA 9:3)
(CORPULENCE) (DIET)

TYAPINA, L. A.

Tyapina, L. A. -- "The Effect of Ascorbic Acid on Blood Lipids in Hyper-Tonic Disease and Atherosclerosis." Acad Med Sci USSR. Moscow, 1956. (Disseration For the Degree of Candidate in Medical Sciences).

So: Knizhnaya Letopis', No. 11, 1956, pp 103-114

TYAPINA, Lidiya Antonovna; KULEVOVA, A.M., red.; BUL'DYAYEV, N.A.,
tekhn.red.

[Weight-reducing diet] Kak pitat'sia pri ozhirenii. Moskva,
Gos.izd-vo med.lit-ry Medgix, 1958.   49 p.   (MIRA 13:1)
                        (CORPULENCE)

AUTHORS: Lebedev, R.,   Smorodinskiy, Ya.,   S/053/60/070/02/009/016
             Tyapkin, A.   B006/B007

TITLE: The Physics of Elementary Particles

PERIODICAL: Uspekhi fizicheskikh nauk, 1960, Vol 70, Nr 2, pp 361-374
             (USSR)

ABSTRACT: The authors give a report on the International Conference
             on High Energy Physics held at Kiyev in July 1959. This
             report is interesting above all because of the voluminous
             material of the work carried out at Dubna (USSR). The Con-
             ference was attended by about 150 delegates from Eastern
             Block countries, and by about the same number from other
             countries. As regards organization, the Conference introduced
             a novel arrangement which essentially consisted in the fact
             that "reporters" and "scientific secretaries" were attached
             to the lecturers, and that the lectures could be heard in
             Russian and in English. The secretaries were in all cases
             well-known Russian physicists. Leading physicists acted as
             chairmen of the plenary sessions; the Russian chairmen were

Card 1/6

The Physics of Elementary Particles

D. I. Blokhintsev and I. Ye. Tamm. Two of the seven holders
of the Nobel Prize represented were Russians: I. Ye. Tamm
and P. A. Cherenkov. Apart from the surveying lectures
seminars were held, in which the following Russian lecturers
spoke: I. Ye. Tamm on "Diagram Technique and Field Theory",
D. D. Ivanenko on the "Nonlinear Field- and Gravitation
Theory", V. P. Dzhelepov on "Nucleon-Nucleon Collisions", and
I. V. Chuvilo on "Bubble Chambers". The plenary sessions
began on July 20. In the first session Bernardini (CERN)
spoke. His scientific secretaries were A. Baldin and A. Belousov
(Moscow). The report on the lecture mentions the data obtain-
ed at the Fizicheskiy institut im. P. N. Lebedeva AN SSSR
(Physics Institute imeni P. N. Lebedev AS USSR) on the "Polar-
izability of Protons in (γp)-Collisions". B. Pontekorvo
(Dubna) delivered a lecture, which is discussed here in de-
tail, on "Pion Scattering by Nucleons and Production of Single
Pions in Nucleon-Nucleon and Pion-Nucleon Interactions"

Card 2/6

The Physics of Elementary Particles

(Scientific Secretaries A. Mukhin, Yu. Prokoshkin, and L. Soroko (Dubna)). First, he gave a survey of new experimental data contributing towards explaining the problem of the charge-independence of pion- and nucleon processes, and further data concerning the search for the ϱ^o-meson, and details concerning new work relating to pion angular distribution. Investigations of single pion production in (nn)-collisions resulted in experimental agreement with the phenomenological theory of Mandel'shtam, which demands that π-n-resonance interactions occur in a state with isotopic spin $T = 3/2$. In the following lecture by Segrè, M. Shafranov and V. Shakhbazyan (Dubna) acted as scientific secretaries. Next, V. I. Veksler (Dubna) spoke about "Nucleon-Nucleon and Pion-Nucleon Interactions in the 1.5 - 10 Bev Range" (Scientific Secretaries: N. Bogachev, V. Grishin, and M. Podgoretskiy (Dubna)). He delivered a report on the investigations carried out in the past years in Dubna and made a comparison with theoretical results. Figure 1 shows the photograph supplied by him of the production and the decay of Λ^o and anti-Λ-

Card 3/6

The Physics of Elementary Particles

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B006/B007

hyperons. Investigations of the (pp)-scattering cross sec-
tion yielded new results indicating that the scattering
amplitude in the optical model has not only an imaginary-
but also a real part. New data were obtained at Dubna also
for the total elastic and inelastic (pp)- and (πp)-scattering
cross sections at 9 and 7 Bev, respectively. Investigations
carried out by I. Ye. Tamm are mentioned. In the following,
Ya. A. Smorodinskiy (Dubna) spoke about (nn)-scattering
(Scientific Secretaries B. Golovin (Dubna) and L. Puzikov
(Moscow)) and Chew (Secretaries: L. Lapidus (Dubna) and Yu.
Novozhilov (Moscow)). At Dubna proton accelerations to 635 Mev
are possible. At the following three surveys on electro-
magnetic interaction and nucleon structure A. Varfolomeyev
and L. Solov'yev (Moscow) as well as S. Bilen'kiy and B.
Barbashov (Dubna) acted as scientific secretaries. There
followed a lecture delivered by Steinberger, whose scientific
secretaries were E. Okonov and R. Ryndin (Dubna). The lecturer
Alvarez was assisted by the secretaries A. Lyubimov and

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The Physics of Elementary Particles   S/053/60/070/02/003/016
                                                   B006/B007

N. Petukhova (deceased) (Dubna), and Salam by the secretaries
B. Valuvev and V. Solov'yev (Dubna). A special session of the
Conference dealt with the problem of dispersion relations.
D. V. Shirkov (Dubna), spoke about the theory (secretaries:
V. Vladimirov and A. Logunov); the second lecture dealing
with this subject was delivered by Lehmann (secretaries: V.
Favnberg and O. Parasyuk (Moscow)). A further special session
dealt with theoretical single reports ("New Theoretical Ideas").
Among others, Landau spoke about diagram technique, Garibyan
(Yerevan) on the radiation of relativistic particles in the
passage through the boundary between two media. Two further
lectures dealt with weak interaction problems: A. A. Alikhanov
(Moscow) (experimentally) and R. Marchuk (theoretically);
the scientific secretaries were B. Ioffe and V. Lyubimov, and L.Okun'
and I. Shapiro (Moscow) respectively. At Dubna the muon pre-
cession in the magnetic field was investigated, and direct
proof was supplied for the first time that muon spin is half-
integral. The group of research scientists at Dubna further

Card 5/6   succeeded in proving the radiationless muon capture by heavy

The Physics of Elementary Particles

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B006/B007

nuclei (nuclear excitation), as predicted by Zaretskiy (Moscow).
During the following lecture delivered by Glaser, I. Kobzarev
acted as scientific secretary and during that delivered by
Powell, I. Gramenitskiy (Dubna), V. Maksimenko (Moscow), and
V. Kharitonov (Yerevan). A survey on the theory of multiple
production of particles in the case of ultra-high energies
was finally delivered by Ye. L. Feynberg (Moscow), D. Chernav-
skiy (Moscow) and V. Barashenkov (Dubna) acting as his scienti-
fic secretaries. During the Conference the delegates paid a
visit to the Institut fiziki AN USSR (Institute of Physics of
the AS UkrSSR) at Kiyev, after which many foreign delegates
visited Dubna. There are 4 figures.

Card 6/6

29189

S/021/60/000/010/011/016
D251/D303

$3.9110\ (1121,1482)$

AUTHOR: Tyapkin, K.F.

TITLE: On applying the formulae of the plane problem to
            interpreting magnetic anomalies due to geological
            objects with finite strike

PERIODICAL: Akademiya nauk Ukrayins'koyi RSR. Dopovidi, no. 10,
            1960, 1396 - 1399

TEXT: The author suggests that the formulae of the plane problem
of potential theory may be applied to the problem of magnetic ano-
malies due to geological objects. In his earlier work (Ref. 1: DAN
URSR, 441, 1960) on the similar problem of gravitational anomalies
the author derived the formulae

$$\int_{-\infty}^{\infty} V_{xz}dy = V'_{xz}; \quad \int_{-\infty}^{\infty} V_{yz}dy = 0; \quad \int_{-\infty}^{\infty} V_{zz}dy = V'_{zz} \quad (1)$$

etc., where V_{xz}, V_{yz}, V_{zz} are second derivatives of the gravitatio-
Card 1/4

On applying the formulae of ...

nal potential, and V'_{xz}, V'_{zz} are the corresponding second derivati-
ves of a gravitational potential for a two-dimensional body. Con-
sidering the magnetic field problem gives

$$X = \frac{I}{k\sigma} \{V_{xx} \cos \alpha + V_{xy} \cos \beta + V_{xz} \cos \gamma\}$$

$$Y = \frac{I}{k\sigma} \{V_{xy} \cos \alpha + V_{yy} \cos \beta + V_{yz} \cos \gamma\}$$

$$Z = \frac{I}{k\sigma} \{V_{xz} \cos \alpha + V_{yz} \cos \beta + V_{zz} \cos \gamma\}$$

(2)

where I is the intensity of magnetism of the body; σ is the excess
or defect in solidity of the body, k is the gravitational constant
cos α, cos β, cos γ are the direction cosines of the intensity vec-
tor I; V_{xz}, V_{yz}, V_{zz}, etc. are the second derivatives of gravita-
tional potential. Integration with respect to y gives

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S/021/60/000/010/011/016
D251/D303

On applying the formulae of ...

$$\int_{-\infty}^{\infty} X dy = \frac{I}{k_a} [V'_{xx} \cos \alpha + V'_{xz} \cos \gamma]$$

$$\int_{-\infty}^{\infty} Y dy = 0$$

$$\int_{-\infty}^{\infty} Z dy = \frac{I}{k_a} [V'_{xz} \cos \alpha + V'_{zz} \cos \gamma]$$

(3)

where

$$V'_{xx} = \int_{-\infty}^{\infty} V_{xx} dy, \quad V'_{xz} = \int_{-\infty}^{\infty} V_{xz} dy, \quad V'_{zz} = \int_{-\infty}^{\infty} V_{zz} dy.$$

The curves obtained may be used for directly computing magnetic
anomalies, or they may be reduced to values proportional to the
second derivatives of the gravitational potential, by taking into
account the direction of the vector I. There are 3 Soviet-bloc re-

Card 3/4

On applying the formulae of ...   S/021/60/000/010/011/016
                                        29189
rerences.   D251/D303

ASSOCIATION: Dnipropetrovs'kyy hirnychyy instytut im. Artema (Mi-
             ning Institute of Dnipropetrovs'k im. Artem)
PRESENTED: by V.H. Bondarchuk, Academician AS UkrSSR
SUBMITTED: August 24, 1959

Card 4/4

TYAPKIN, K.F.

Determining the settling depth of ferruginous rocks using
magnetic prospecting in the Krivoy Rog. Geofiz. sbor.
no.8:81-87 '64.   (MIRA 18:6)

1. Dnepropetrovskiy gornyy institut imeni Artema.

STUPAK, N.K.; TYAPKIN, K.E.

Interpretation of local magnetic anomalies produced by sheetlike
bodies. Trudy NIGMIR no.16:72-81 '60.   (MIRA 14:3)
(Magnetic anomalies)

TYAPKIN, K.F. Prinimali uchastiye: GOLIK, A.I., inzh.; KHARCHENKO, S.F.,
inzh.; FILIPPOVA, T.S., inzh.; BORUSHKO, T.I., red.izd-va; IVANOVA,
A.G., tekhn. red.

[Interpretation of gravity anomalies caused by finite geologic
structures along the strike] Interpretatsiia gravitatsionnykh
anomalii, obuslovlennykh konechnymi po prostiraniiu geologiche-
skimi ob"ektami. Moskva, Gos. nauchno-tekhn. izd-vo lit-ry po geol.
i okhrane nedr. Pt.1. 1961. 78 p.   (MIRA 14:11)
(Gravity prospecting)

TYAPKIN, K.F.

Chart for computing Δg anomalies caused by vertical cylindrical
bodies of arbitrary cross section. Geofiz.razved. no.4:23-31 '61.
(MIRA 14:7)

(Gravity prospecting)

TYAPKIN, K.F.

Interpretation of gravity anomalies caused by bodies of finite
extension. Geofiz.razved. no.4:31-37 '61.
(Gravity prospecting)   (MIRA 14:7)

TYAPKIN, K.F.

Taking into account the influence of adjacent bodies in
the interpretation of gravity anomalies in the Krivoy
Rog Basin. Izv. DGI 42:106-111   '64.   (MIRA 18:11)

3(5)   SOV/21-59-3-7/27
AUTHOR: Tyapkin, K.P

TITLE: Palettes for Interpretation of Vzz Anomalies Called
               Forth by Finite Cylindrical Bodies (Paletki dlya in-
               terpretatsii anomaliy Vzz obuslovlennykh konechnymi
               tsilindricheskimi telami)

PERIODICAL: Dopovidi Akademii nauk Ukrains'koi RSR, 1959, Nr 3,
               pp 257-260 (USSR)

ABSTRACT: In 1958 the Ukrainian joint geophysical expedition
               produced calculations of the numerical values of
               vertical derivatives V_{zz} of quantities Δg observed
               on the spot **in studying**   anomalies of the Ukrai-
               nian crystalline shield, within four trapeziums, on
               the 1:200,000 scale. Those calculations showed
               that the use of "V_{zz}"s in place of "Δg"s resulted in
               obtaining more concrete data on the unhomogenous
               character of the Ukrainian crystalline shield. The
               obtained values of "V_{zz}"s can be used for calculat-
               ing other anomalies, for they are, to a great ex-
Card 1/2   tent, free from specific influences of the given

Palettes for Interpretation of Vzz Anomalies Called Forth by
Finite Cylindrical Bodies

region. That being so, the author suggests special
palletes for calculating values of Vzz, called
forth by finite cylindrical bodies. They can be
used in choosing appropriate profiles compiled on
the results of gravimetrical observations. The
author provides a mathematical calculation of the
palette by way of solution of an equation (6) and
a coordinate-system formula (7). There are 2
sketches and 5 Soviet references.

ASSOCIATION: Dnepropetrovskiy institut gornogo dela im. Artema
(Dnepropetrovsk Mining Institute imeni Artem)

PRESENTED: By V.G. Bondarchuk, Member of the AS UkrSSR

SUBMITTED: October 17, 1958

Card 2/2

AUTHORS: Bayukov, Yu. D., Kozodayev, M. S., Markov, A. A., Sinayev,
A. N., Tyapkin, A. A.

TITLE: A Multichannel Pair γ-Spectrometer. I. Calculation of the
Main Characteristics of the γ-Spectrometer (Mnogokanal'nyy
parnyy gamma-spektrometr. I. Raschet osnovnykh kharakteri-
stik-gamma-spektrometra)

ABSTRACT: In a pair γ-spectrometer the energy of the quanta is de-
termined by measuring the total energy of the components of
the electron-positron pair formed in a thin converter. The
first 2-channel pair spectrometer was built by Dzhelepov
(Ref.1). Later spectrometers built on this principle were
widely used in measuring the spectra of hard γ-rays (Refs.2
to 8). The electron and the positron leaving the converter
were deflected by a magnetic field in different directions
and for certain values of their energy they enter ionisation
counters connected in coincidence. For a given intensity of
the magnetic field and a fixed position of the counters, such
a spectrometer will record a fraction of the pairs produced
by γ-rays in a given energy range. In a simple 2-channel
spectrometer in which one channel records the electrons and

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A Multichannel Pair γ-spectrometer. I. Calculation of the Main
Characteristics of the γ-spectrometer

the other the positrons, an increase in the accuracy of
measurement is associated with a marked decrease in the
efficiency. Good energy resolution and high efficiency can
only be simultaneously achieved in a multichannel spectro-
meter. In such a spectrometer the efficiency may be increased
by a factor $n_1 n_2$ without loss of resolution, where n_1 and
n_2 are the numbers of electron and positron counters. In
such a spectrometer several energy intervals may be examined
at the same time. A number of such multichannel spectro-
meters have been described (Refs.5, 6 and 8). The quality
of a γ-spectrometer as a measuring instrument is determined
by its efficiency and spectral sensitivity. In designing a
multichannel system it is necessary to take into account these
characteristics for the various pairs of channels of the
spectrum. In this connection, a discussion is given in the
present paper of the dependence of the efficiency and spec-
tral sensitivity of the separate pairs of channels on various

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parameters of the spectrometer:
1) <u>Spectral sensitivity</u>: the basic diagram of a γ-spectro-
meter considered in this paper is shown in Fig.1, in which
the meanings of the symbols employed are indicated. In view
of the finite width of the counters, the spectrometer records
γ-quanta in a certain energy interval from $E_{\gamma \min}$ to

$E_{\gamma \max}$. The corresponding spectral sensitivity curve is
then shown in Fig.2a and is of triangular form with a dis-
persion given by

$$\sigma_{1^2} = 1/6 \; \ell_c^2/(r_1 + r_2)^2 \quad \text{where} \quad \ell_c \text{ is the width of a}$$

counter and r_1 and r_2 are the distances from the con-
verter to the centres of the counters, respectively. The
effect of the width of the converter upon the spectral
sensitivity is examined and it is shown that a converter of
a finite width introduces a spread into the spectral line
in the high energy region of γ-quanta. As the angle φ
between the direction of motion of the γ-quanta and the
Card 3/6   straight line connecting the centre of the converter with

A Multichannel Pair γ-spectrometer. I. Calculation of the Main
Characteristics of the γ-spectrometer

the counter increases, the spread of the spectral line de-
creases. At $\varphi = 90^\circ$ the width of the spectral sensitivity
curve is independent of the converter width. The effect of
the converter width gives a distribution of the form shown
in Fig.2b, which has a dispersion given by:

$$\sigma_2^2 = \frac{\ell_k^4 \mathrm{ctg}^4 \varphi}{180 r_1^2 \cdot r_2^2} \qquad . \qquad \text{The effect of multiple}$$

scattering in the converter is estimated and expressions
are derived for this effect also. Finally, an estimate is
given for the radiation loss experienced by the electron-
positron pair on traversing the converter.
2) Efficiency: in this section the Bethe-Heitler expression
for the probability of formation of a pair by a γ-quantum of

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A Multichannel Pair γ-spectrometer. I. Calculation of the Main
Characteristics of the γ-spectrometer

energy E_γ is used (Ref.13) with a modification described
by Bethe et al in Ref.22.

3) <u>Multichannel system</u>: in a multichannel spectrometer the
electrons and positrons formed by γ-quanta of a given energy
are recorded by a number of combinations of pairs of counters.
The electronic circuit of such a spectrometer should record
coincidences between pulses from each electron counter with
pulses from any positron counter. Thus, any combination of
one electron counter and one positron counter is, in fact, a
2-channel spectrometer. For a given geometry a spectrometer
containing n channels records γ-quanta in n-1 energy in-
tervals of different mean energy. In practice, one seeks to
find the form of the spectrum and the absolute intensity in
one of the energy intervals. To find the form of the spec-
trum it is sufficient to know the relative efficiency of
recording for the different energy intervals, and this is
given by Eq.(10). In order to obtain the absolute intensity
in one of the energy intervals it is necessary to know the
total absolute efficiency of recording of γ-quanta in one
of the energy intervals. This problem is not treated.

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A Multichannel Pair γ-spectrometer. I. Calculation of the Main
Characteristics of the γ-spectrometer

> V. V. Mel'nikov is thanked for carrying out a number of
> calculations. There are 2 figures and 22 references, of
> which 4 are Soviet, 1 German, 1 Soviet translated from
> English and the rest are English.

ASSOCIATION: Ob".yedinennyy institut yadernykh issledovaniy
(United Institute for Nuclear Studies)

SUBMITTED: December 27, 1957.

Card 6/6

SOV/120-58-6-5/32

AUTHORS: Bayukov, Yu. D., Kozodayev, M. S., Markov, A. A. Sinayev, A.N., Tyapkin, A. A.

TITLE: A Multichannel Pair γ-Spectrometer. II. Description of a 12-channel Spectrometer (Mnogokanal'nyy parnyy gamma-spektrometr. II. Opisaniye dvenadtsatikanal'nogo spektrometra)

ABSTRACT: Application of a multichannel pair spectrometer in synchro-cyclotron work presents a number of specific requirements as far as counters of the ionising particles and the electronic system of the spectrometer are concerned. Since the beam intensity is high and consists of short pulses of 200 to 300 μs each at a repetition frequency of 40 to 80 pulses per sec, it follows that the apparatus must be very fast. It is desirable that the input blocks should have resolving times not greater than 1 μs. The large background intensity in synchro-cyclotron work means that it is always necessary to use a special selection system which records only electron-positron pairs. For this reason, in the spectrometer each component of a pair should be recorded by a number of counters in coincidence with sufficiently low resolving time. The
Card 1/7 present paper describes a 12-channel γ-spectrometer which has

A Multichannel Pair γ-Spectrometer. II. Description of a 12-channel
Spectrometer

been used over a number of years in studying the spectra of
hard γ-rays and neutral π-meson decays (Refs.2-6). The
first variant of the spectrometer was built in 1949. In 1951
and 1954 the spectrometer was modified to improve its charac-
teristics. The spectrometer described here satisfies com-
pletely the above requirements and is based on the design
calculations given in the previous paper (Ref.1) in this
issue.
1) Magnetic system and geometry of the instrument.
The magnetic field is produced by an SP-56 electromagnet.
Fig.1 shows the disposition of the counters for two types of
demountable pole pieces. The gap between the poles is 3 c.
and the maximum field in the gap is 18 000 oersted. The
electromagnet current is stabilised to 0.1%. In studies of
γ-ray spectra in the energy region 20 to 200 MeV, $2\varphi = 180^{0}$
(Fig.1b) and in the energy region 100 to 450 MeV, $2\varphi = 90^{0}$
(Fig.1a). In the former case semi-circular focussing of

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A Multichannel Pair γ-Spectrometer. II. Description of a 12-channel
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electrons and positrons was used, and this led to increased
efficiency (Ref.1) because it was possible to use wider and
thicker converters. For γ-quqnta in the energy range 450-
600 MeV, $2\varphi = 90^0$ but the counters were at a larger distance
from the converter. Copper converters were used (0.1, 0.3
and 0.5 mm, depending on the energy).
2) Resolving power and efficiency.
Fig.2 shows curves of the total spectral sensitivity for the
7th energy interval for various values of $E_{\gamma 0}$ and thick-

nesses T_k of the copper converters. These curves are based

on the theoretical data given in the previous paper and are
obtained by a statistical combination of the partial distri-
butions due to a) width of the counters, b) width of the con-
verter, c) multiple scattering and d) radiation. As can be
seen, the form of the total spectral sensitivity curve is
very nearly triangular, which means that the total spectral
sensitivity is governed mainly by the width of the channels
ℓ_c (see Fig.1 of previous paper, p 24, this issue).

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> 3) <u>Counters and selection system</u>. The counters used were
> proportional counters having a cylindrical stainless steel
> cathode, 10 mm in diameter and a molybdenum filament 0.1 mm
> in diameter. They were filled with $(CH_2(OCH_3)_2)$ at a
> pressure of 160 to 200 mm. The working voltage was 1600 to
> 2000 V. The counters have an effective dead time not ex-
> ceeding 10^{-7} sec. The efficiency of the counters for par-
> ticles with relativistic ionisation reaches 98% in a coin-
> cidence scheme with a resolving time of 5×10^{-7} sec. The
> delay of the pulses due to drift of electrons through the
> counter gas is less than 10^{-7}. The counters give electri-
> cal pulses with amplitudes between 10^{-4} and 1 V. The large
> difference in the amplitudes requires the use of amplifiers
> having a wide dynamic range and an amplification of a few
> thousands. 6-fold coincidences were used and the number of
> random coincidences in each 6-fold channel was 0.02 pulses
> per sec. The number of electron-positron pairs recorded per

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A Multichannel Pair γ-Spectrometer. II. Description of a 12-channel
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sec depended on the efficiency of the spectrometer with
respect to the γ-quanta in the measured energy interval and
the form of the spectrum and was in the range 0.1 to 10 pairs
per sec.
4) Electronic scheme.
A block diagram of the electronic part of the spectrometer is
shown in Fig.3. The left-hand portion of this diagram shows
6 co-ordinate counters of the electron series ($a_1 - a_6$), 6

co-ordinate counters of the positron series ($б_1 - б_6$) and

4 selection counters (A', A", б' and б"). Each of these
counters in practice consists of a group of counters whose
filaments are connected. A recorded electron or positron
should pass through 3 counters (1 co-ordinate and 2 selection
counters). A pair is recorded if a 6-fold coincidence takes
place. Negative-going pulses from each counter are ampli-
fied by a corresponding amplifier-converter (Fig.4). These
amplifiers have a rise time of 2×10^{-4} sec. Pulses from
all the 16 amplifier-converters are applied to the main block
which is at a distance of 1.5 m from the amplifier-converters
Card 5/7 (Fig.5). Pulses from the selection counters are applied to a

A Multichannel Pair γ-Spectrometer. II. Description of a 12-channel
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4-fold coincidence scheme while pulses from the co-ordinate
counters are applied to mixers and in addition through delay
lines to a hodoscopic system consisting of 2-fold coincidence
circuits and output univibrators. The pulse at the output
of a mixer appears in the presence of a pulse in at least one
of the co-ordinate counters of a given series. Pulses from
both the mixers and also from the 4-fold coincidence scheme
are applied to a 3-fold coincidence scheme which produces the
final output pulse. It follows that the latter pulse appears
when a 6-fold coincidence takes place, i.e. when a particle
passes through at least one of the co-ordinate counters in
the electron series, through one of the co-ordinate counters
of the positron series, and all the counters of the selection
system. The resolving time of the above coincidence schemes
is 5×10^{-7}.
5) <u>Method of measurement and treatment of results.</u>
Fig.7 shows the experimental arrangement. In this figure 1
is the proton trajectory, 2 is the target, 3 is the synchro-
cyclotron chamber, 4 is a concrete wall, 5 is a collimator,

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A Multichannel Pair γ-Spectrometer. II. Description of a 12-channel
Spectrometer

      6 is a diaphragm, 7 is a clearing magnet which removes
electrons and positrons from the beam, 8 is an additional
screen, 9 is the convertor and 10 is the spectrometer
electro magnet. Fig.8 shows a typical result obtained for
the energy spectrum of γ-quanta from neutral π-meson decays.
The mesons were produced by 660 MeV protons at a carbon target.
The spectra are measured at an angle of 180-0° to the direct-
ion of motion of the protons. G.P.Zorin, B.A.Krasnovidov,L.
A.Fadeyev and G.N.Stepanov are thanked for their assistance.
There are 8 figures, 4 tables and 7 Soviet references.

ASSOCIATION: Ob"yedinennyy institut yadernykh issledovaniy (United
      Institute for Nuclear Studies)

SUBMITTED: December 27, 1957.

Card 7/7

ZHELOV, V.P.; TYAPKIN, A.A.; FARAGO, P.S.

Measurement of the mass of 660 Mev protons. Zhur.eksp. i teor. fiz.
34 no.3:555-558 Mr '58.   (MIRA 11:4)

1.Ob"yedinennyy institut yadernykh issledovaniy.
                      (Protons)

I YAPKIN, A.A.

USSR/Nuclear Physics - Elementary Particles.   C.3

Abs Jour   : Ref Zhur - Fizika, No 1, 1958, 363

Author   : Bayukov, Yu.D., Kozodayev, M.S., Tyapkin, A.A.

Inst   : Joint Institute for Nuclear Research.

Title   : Investigation of Energy and Angular Distributions of π^0
               Mesons, Formed on Carbon Nuclei by 470 and 660 Mev Protons

Orig Pub   : Zh. eksperim. i teor. fiziki, 1957, 32, No 4, 667-677

Abstract   : An investigation was made of the energy spectrum of
               gamma-quanta from the decay of π^0 mesons, formed by 660
               Mev protons on carbon nuclei. The angular and energy dis-
               tributions of the π^0 mesons, obtained from the analysis
               of the gamma-quanta spectra formed on carbon nuclei by
               470 and 660 Mev protons, are given. The results of the
               investigations are presented graphically.

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USSR/Nuclear Physics - Elementary Particles.

Abs Jour   : Ref Zhur - Fizika, No 1, 1958, 358

maximum momentum of the π^0 meson, raised to the 5.5 power. The angular distribution of the π^0 mesons, which is essentially anisotropic at proton energies of 450 Mev, becomes isotropic as the energy increases to 660 Mev.

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Tyapkin, A.A.

USSR/Nuclear Physics - Elementary Particles.   C-3

Abs Jour   : Referat Zhur - Fizika, No 1, 1958, 355

Author   : Bayukov, Yu.D., Tyapkin, A.A.

Inst   : Joint Institute for Nuclear Research.

Title   : Energy Spectrum of Gamma Quanta from the Decay of π^0
              Mesons Formed by 660 Mev Protons on Hydrogen Nuclei.

Orig Pub   : Zh. eksperim. i teor. fiziki, 1957, 32, No 5, 953-956

Abstract   : The energy spectrum of gamma quanta from the decay of
              π^0 mesons, formed by 660 Mev protons on hydrogen nu-
              clei is measured. From the analysis of the gamma-quanta
              spectrum the authors obtain the angular and energy dis-
              tributions of the π^0 mesons, formed in pp collisions.
              The results of the measurements are represented graphi-
              cally.

Card 1/1

TYAPKIN, A.S.

A railread track straightener. Stal' 7:78 '47.   (MLRA 9:1)
(Railreads--Track)

SOKOLOVA, Ye.B., kandidat arkhitektury, starshiy nauchnyy sotrudnik; KOVEL'-
MAN, I.A., kandidat tekhnicheskikh nauk, nauchnyy redaktor:
TYAPKIN, B.G., redaktor izdatel'stva; MEL'NICHENKO, F.P., tekhni-
cheskiy redaktor.

[New face materials for facades] Novye fasadnye oblitsovochnye
izdeliia. Moskva, Gos. izd-vo lit-ry po stroit. i arkhit., 1956.
22 p. (Ratsionalizatorskie i izobretatel'skie predlozheniia v
stroitel'stve, no.133).   (MLRA 10:8)
                    (Ceramic materials)   (Facades)

TYAPKIN, B.G., izd.red.; UMOD, V.Ye.,izd.red.; DAKHNOV, V.S.,tekhn.red.

[Papers by the Section on the use of precast concrete and concrete
in transportation construction] Materialy raboty sektsii po primeneniiu
sbornogo zhelezobetona i betona v transportnom stroitel'stve.
Moskva, Gos. izd-vo lit-ry po strolt. i arkhit., 1956. 95 p. (MIRA 11:8)

1. Vsesoiuznaya konferentsiya po zhelezobetonu i betonu. Moscow, 1955.
        (Precast concrete construction)
        (Concrete construction)

NEYEVIN, Ye.A.; KOVALEV, G.N.; LEVINA, F.M., red.; TYAPKIN, B.G., red.
izd-va; GILENSON, P.G., tekhn.red.

[Construction industry on the road to further technical progress;
aid for lecturers] Stroitel'stvo na puti tekhnicheskogo progressa;
v pomoshch' dokladchikam i lektoram. Moskva, Gos.izd-vo lit-ry
po stroit., arkhit. i stroit.materialam, 1959. 58 p.
(MIRA 13:1)

(Construction industry)

TYAPKIN, B.G.

ZIMIN, Petr Aleksandrovich, kand.tekhn.nauk; TYAPKIN, B,G., red.izd-va;
GUSEVA, S.S., tekhn.red.

[Mechanization of construction work; brief survey of developments
during the last 40 years] Mekhanizatsiia stroitel'stva; kratkii
obzor razvitiia za 40 let. Moskva, Gos.izd-vo lit-ry po stroit.i
arkhit., 1957. 90 p.   (MIRA 11:1)
                    (Construction industry)

PA 34T41

TYAPKIN, D. P.

Aug 1947

USSR/Mechanics
    Machinery - Design
    Measurements

"Associated Measurements," D. P. Tyapkin, Candidate
in Technical Sciences, 2 pp

"Stanki i Instrument" No 8

Two is the least amount of linear combined measure-
ments which can be made on part designs. This arti-
cle discusses the various variations for the arrange-
ments of measurements, associated measurements, and
methods for the control of associated measurements.
Many mathematical formulas and diagrams showing their
application.

34T41

FDB

T YAPKIN, D. P.

Candidate of Technical Sciences

"Determining the Pressure Magnitude Limits in
Forming Drawing (Broaching) with a Decrease in
the Thickness of Walls"

Stanki I Instrument, 17, No. 7-8, 1946

BR-52059019

TYAPKIN, D.R., kandidat tekhnicheskikh nauk, dotsent.

Interconnected dimensions. Stan. i instr.18 no.8 Ag '47. (MLRA 9:1)
(Machinery--Design) (Mechanics, Analytic)

TYAPKIN, K.F.

Determining the vertical coordinate of the center of gravity of
two-dimensional objects from results of magnetic observations.
Dop.AN URSR no.7:888-891 '60.   (MIRA 13:8)

1. Dnepropetrovskiy gornyy institut im.Artema. Predstavleno
akademikom AN USSR V.G.Bondarchukom [V.H.Bondarchukom].
                    (Gravity)